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USDA ENVIRONMENTAL STATEMENT
SOUTH FORK WATERSHED PROJECT
Pawnee and Richardson Counties, Nebraska

Prepared in Accordance with Sec. 102(2)(C) of P. L. 91-190

SUMMARY SHEETS. DEPT. OF AGRICULTURE
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CATALOGED

- I Final
- II Soil Conservation Service
- III Administrative

IV Description of Action:

A watershed project to be carried out by the sponsoring local organization with Federal assistance under authority of Public Law 566. The project, located in Pawnee and Richardson Counties, Nebraska, proposes conservation land treatment within the watershed supplemented by 14 grade stabilization structures. Two floodwater retarding structures and one multiple-purpose reservoir with storage capacity for floodwater and recreation will be constructed. In association with the recreation water, surrounding lands will be purchased for installation of recreation facilities and opened to the public.

V Summary of Environmental Impact and Adverse Environmental Effects:

Project action will: reduce erosion; reduce sediment delivered to the Nemaha and Missouri Rivers; reduce gully development at 14 locations; protect 1,591 acres of agricultural land from depreciation or destruction by gully development; reduce damages to roads and bridges; reduce flood damages to 606 acres of agricultural land; reduce fire hazard in the area; increase multiple-use benefits on 330 acres of private woodlands; create 175 acres of surface water that will increase fish habitat plus resting and feeding areas for waterfowl, 84.5 acres at one location opened for public recreation use; eliminate agricultural use on 423 acres; temporarily eliminate wildlife use on 33 acres of construction areas until revegetated; convert 311 acres from private agricultural land to public ownership for recreational use.

VI List of Alternatives Considered:

- A. Conservation land treatment alone.
- B. Flood plain zoning or public purchase.
- C. Plan as presented without including land and water for public use.
- D. No Project.

VII Agencies from Which Comments Have Been Received are as follows:

- U. S. Department of Commerce
- U. S. Department of Health, Education and Welfare
- U. S. Department of the Army
- U. S. Department of the Interior
- U. S. Department of Transportation
- U. S. Environmental Protection Agency, Region VII
- Governor of Nebraska

VIII The Final Environmental Statement was transmitted to the Council on Environmental Quality on November 7, 1973.

Draft Statement received by CEQ January 2, 1973.

32458

USDA SOIL CONSERVATION SERVICE ENVIRONMENTAL STATEMENT.

Title of Statement: THE SOUTH FORK WATERSHED PROJECT
Pawnee and Richardson Counties, Nebraska

Type of Statement: Draft () Final (X)

Date: October 1973

Type of Action: Administrative (X)

Statement

1. Description

Authority for Project: Federal assistance through Public Law 566, 83d Congress, 68 Stat. 666, as amended.

Sponsoring Local Organization: Nemaha Natural Resources District.

Purpose of Project: To reduce damages from floodwaters, erosion, and sediment deposition. To improve the opportunity for water-based recreation.

Project Measures: The project plan provides for conservation land treatment measures, 14 grade stabilization structures, 2 floodwater retarding structures, and 1 multiple-purpose reservoir, with storage capacity for floodwater and recreation, and associated recreation facilities.

Environmental Setting

Physical Data: South Fork Watershed is located in Pawnee and Richardson Counties, Nebraska. The watershed is in southeast Nebraska, about 25 miles west of Falls City, Nebraska. ^{1/} Consisting of 31,110 acres (48.61 mi.²), it is about 14 miles long and 8 miles in maximum width. Most of the watershed is in Pawnee County (22,160 acres) with Richardson County containing 8,950. About 1,370 acres drain into this watershed from the State of Kansas; however, this portion of the natural drainage is not a legal part of the watershed (project map).

South Fork Watershed consists of 2 hydrologic units (Lores and Negro Branches) and several small unnamed tributaries that flow directly into the Big Nemaha River. Surface elevations vary from 1,300 feet along the divide to 990 feet in the channels at the lower end of the watershed giving a total relief of 310 feet. The channel grade will average 20 feet per mile in the lower one-half of the watershed and somewhat steeper in the upper portions.

^{1/} All information and data, except as otherwise noted by reference to source, were collected during watershed planning investigations by the Soil Conservation Service, U. S. Department of Agriculture.

Most precipitation in this area is from high intensity, short-duration thunderstorms averaging 31.6 inches annually. The maximum recorded 24-hour precipitation is 8.2 inches on September 4, 1958, at the Pawnee City Weather Station, approximately 1 mile from the upper end of the watershed. Yearly temperatures average 53.9 degrees with monthly averages ranging from 26.6 to 79.5 degrees. The average frost-free period is 170 days from April 26 to October 13 with 70 percent of the rainfall occurring during that period. 1/

Waters are used principally for domestic needs and are generally adequate in most areas from wells, ponds, and streams for present use. Rural water supplies are being developed by the use of rural water pipelines to supplement present supplies.

Rainfall often presents flooding problems particularly on Lores and Negro Branches. Problems of major concern resulting from rainfall are sheet and gully erosion which is evident throughout the watershed. These problems were generally initiated by straightening of the Big Nemaha River during the 1910-1920 period which has resulted in channel erosion that has deepened and widened the river channel. Such erosion activated the degrading of side tributaries resulting in damages to land and many varieties of manmade improvements such as roads, bridges, fences, wells, buildings, ponds, and other land treatment measures.

The watershed is a part of the loess-drift hills physiographic region and lies on the Table Rock Arch. It is geologically bisected in Richardson County by the Humboldt Fault. The watershed area consists generally of rolling hills with rounded ridgetops and well-defined, generally entrenched drainageways. Peoria loess mantles the divides and upper slopes with most of the lower and steeper slopes overlain with Kansan till.

Bedrock in the area is generally shales and limestone of the Wabaunsee Group of Upper Pennsylvanian Age. Surface exposures range from the Tarkio limestone down into the Severy shale formation. This represents a geologic section of approximately 200 feet.

Floodplain unconsolidated Pleistocene deposits are represented by fluviatile alluvial deposits of Peoria, Grafton, and Sappa clays and silts. Recent alluvial deposits mantle the flood plain to variable depths.

1/ For further information on climate and character of damaging storms, refer to "Climates of the States - Nebraska" and Weather Bureau Papers 40 and 57.

Soils are generally silty clay and clay loams classified on the uplands as Pawnee, Morrill, Wymore, Kipson, and Sogn series. Bottomland soils are generally of the Kennebec, Judson, or Wabash series.

Pawnee soils are deep, clayey glacial soils developed on gently sloping and moderately sloping uplands while the Morrill soils are deep, loamy glacial soils developed on steeply sloping uplands. Wymore soils are associated with loess parent material and are deep, clayey soils found on level to gently sloping uplands. Relatively shallow, silty to clayey and sometimes stony soils on gently sloping to very steep uplands are usually of the Kipson or Sogn series. Most soils within the watershed are deep and depths to consolidated materials are generally very deep which results in their being easily erodible.

About 24 percent of the watershed cover is native and introduced grasses rated as having fair to good hydrologic conditions. These grasses are randomly scattered throughout the watershed on soils of varying slopes and consist of little bluestem, brome, Indian, big bluestem, switch, and sideoats grama plus other species of lesser importance. Predominant range sites are clayey and shallow limy. Range conditions were determined to be approximately 10 percent excellent, 20 percent good, 50 percent fair, and 20 percent poor.

Woodland cover occupies about 450 acres of this watershed and consists of mixed hardwood stands, mainly on steep to moderate slopes and often occupies lands unsuited for crop or pasture use. Full hydrologic and economic benefits from these woodland areas are presently being prevented due to uncontrolled grazing and poor tree composition and quality. Woodland sites will support such commercial tree species as hackberry, walnut, and oak.

Mineral resources within, or adjacent to, the watershed are represented by local sand and gravel deposits utilized by local people for on-the-farm projects. There are no active quarries, pits, or mines in the watershed. 1/

The lower 2.5 miles of Negro Branch is classified as an "N" channel with a "Pr" flow. The upper portion is an "N" channel with an "I" flow. The lower 6 miles of Lores Branch is classified as an "N" channel with a "Pr" flow. The upper portion is an "N" channel with "I" flows. All side tributaries to Negro and Lores Branch classify as "N" channels with "E" flows. The remaining drainages are direct tributaries to the Big Nemaha River. The lower 1-1.5 miles of these

1/ Directory of Nebraska Quarries, Pits, and Mines - Nebraska Geologic Survey - Resource Report #1 - 1968.

tributaries are "N" channels with "I" flows. The upper portion of these tributaries are "N" channels with "E" flows. ^{1/} The "M" channel classification of the lower portion is a result of scarp advancement up these tributaries from the Big Nemaha. Overfall advancement up these tributaries has physically modified the natural channel regimen to deep and straightened channel regimen.

Economic Data: Livestock and cash-grain farms predominate in Pawnee County. The bulk of the feed grains produced in South Fork Watershed is utilized within the watershed.

South Fork Watershed land is utilized in the following manner:

Cropland	72 percent
Rangeland	21 percent
Woodland	2 percent
Other Land	5 percent

Land use patterns of South Fork Watershed's flood plain are as follows:

Cropland	44 percent
Rangeland	36 percent
Woodland	17 percent
Other Land	3 percent

Principal crops grown in the watershed include corn, grain sorghum, wheat, alfalfa, and native grass. Estimated annual gross value of production per acre of upland areas (unaffected by grade-stabilization programs) is \$72.30. The estimated annual gross value of production per acre (flood-free yields) of the flood plain is \$52.21.

^{1/} Stream classification from USDA-SCS Watershed Protection Handbook, Section 113.09-41, footnotes 3 and 4.

- N - An unmodified, well-defined channel or stream.
- M - Manmade ditch or previously modified channel.
- O - None or practically no defined channel.
- Pr - Perennial - flows at all times except during extreme drought.
- I - Intermittent - continuous flow through some seasons of the year but little or no flow through other seasons.
- E - Ephemeral - flows only during periods of surface run-off, otherwise dry.
- S - Pondered water with no noticeable flow - caused by lack of outlet or high groundwater table.

Woodland sites have good potential for the production of high value hardwood species in addition to related watershed, wildlife, recreation, and aesthetic benefits. A demand now exists for ash, elm, hackberry, walnut, and cottonwood, either standing or delivered to the mill. Woodland products, however, should be carefully harvested to assure continued forest cover and the many related economic and hydrologic benefits. 1/

Most of the watershed is owned by the private sector of the economy. None is under control or jurisdiction of the U. S. Government. The estimated 100 South Fork Watershed farms average 322 acres in size. The estimated market value of upland is \$250 per acre and of flood plain land is \$200 per acre.

The watershed is served by agricultural markets in Pawnee City, Humboldt, and Falls City, Nebraska and Seneca, Kansas. Nebraska State Highways 8 and 50, Kansas State Highway 63, and several secondary roads provide access to agricultural markets for farms located in the watershed.

The population of South Fork Watershed is estimated at 560. It includes 375 people living on farms and 185 living in DuBois. 2/

Less than 30 percent of the Pawnee County farms grossed \$10,000 in 1964. Less than one-third of the farm operators are 45 years of age or younger. The relatively low percentage of population between the ages of 20 and 45 in Pawnee County indicates limited opportunity. 2/

Statistics regarding personal income in Pawnee County for 1970 are \$3,048. This is somewhat lower than the per capita income of Nebraska at \$3,751 or the United States at \$3,921. This lower income indicates a condition of underemployment or that workers are engaged in low productivity jobs. The economy of the watershed area (Pawnee County) is declining and therefore is unstable. The 1970 per capita income has increased from \$2,690 in 1968 which is an increase of 13 percent. During the same 2 years, Nebraska's per capita income increased 17 percent and that of the United States increased almost 15 percent. 2/

A Type IV River Basin study of the Nemaha Basin (including South Fork Watershed) is being conducted.

1/ Information furnished by U. S. Forest Service.

2/ 1970 U. S. Department of Commerce, Bureau of the Census.

A "701" Comprehensive Plan has been developed for Nebraska Planning and Redevelopment Region 7 (which includes Johnson, Nemaha, Pawnee, and Richardson counties).

Fish and Wildlife Resources: Wildlife habitat within this watershed area is considered as high value for upland birds and fur-producing animals. Quail populations within the watershed area are in the 100 to 300 birds per square mile range while pheasant are less than 10 birds per square mile. Cottontail rabbit populations are 100 to 300 while deer are less than 1 per square mile. Nongame birds have high populations especially the mourning dove. Other common forms of wildlife are squirrel, raccoon, fox, muskrat, and coyote. The streams within this watershed are classified as nonproductive for fish. The Big Nemaha River, however, is considered as locally important as a fishery. 1/ No rare or endangered species are known to exist within this watershed area. 2/

Recreation Resources: At present, existing public outdoor water-based recreation facilities are limited. Tuttle Creek Reservoir, a large U. S. Army Corps of Engineers structure on the Big Blue River in Kansas, furnishes most types of water-based recreational activities. This facility is about 55 miles distant to this watershed. Burchard Lake, a 160-acre reservoir maintained by the State of Nebraska, is 35 miles distant to this watershed but recreation is limited primarily to fishing, picnicking, and camping. A 150-acre lake has recently been constructed under P.L.-566 in the Mud Creek Watershed of Nebraska. This lake also contains 275 acres of public land adjacent to it for recreational use. Although it is more than 40 miles from the South Fork Watershed, it does furnish opportunity for fishing, water skiing, boating, swimming, picnicking, camping, and other related activities. Another structure similar to the Mud Creek structure is under construction about 50 miles west of the South Fork Watershed. This structure is also being constructed through assistance of P.L.-566 in the Big Indian Creek Watershed. This structure involves a total of 223 acres of land with a recreational pool of 77 acres.

Water quality information on the streams within the watershed is scarce; however, data does exist on the Nemaha River. This watershed represents a small portion of the Nemaha River drainage area.

- 1/ "The Nebraska Fish and Wildlife Plan" - Volume 1 - Nebraska Wildlife Resources Inventory by Nebraska Game and Parks Commission.
- 2/ From information received from Nebraska Game and Parks Commission and Bureau of Sports Fisheries and Wildlife.

Water quality in the watershed is acceptable for public recreational use if such waters are impounded. This acceptability is both from the standpoint of chemical quality and the lack of point sources of coliform bacteria pollution. 1/ Similar structures previously discussed with similar soils, slopes, and land use that have been constructed for public recreational usage have had acceptable water quality.

Archeological and Historical Values and Unique Scenic Areas: In May 1973 a reconnaissance of the watershed was made by the Midwest Region of the National Park Service in an effort to identify any archeological important sites within the watershed. Only one such site was located near Loes Branch. No known areas of historical significance or unique scenic areas have been identified although in addition to the National Park Service, the Nebraska Historical Society has been kept informed of this proposed project.

Soil, Water, and Plant Management Status: Land use within the watershed is generally commendable with improper land use in upland areas involving less than 2 percent. Land capability classes I, II, III, IV, and VI are represented. 2/

Woodland areas are in relatively poor hydrologic and economic condition. These sites possess strong potential for improvement through planned project measures.

Based on the cost of total land treatment needs and value of land treatment applied to date, 65 percent of the land treatment is now on the land.

Pawnee County Soil and Water Conservation District was formed February 25, 1939. Richardson County Soil and Water Conservation District was formed October 7, 1939. Pawnee and Richardson counties have signed 175 cooperative district agreements and completed 124 basic conservation farm plans in the watershed. The watershed has a potential for 215 cooperators and basic conservation farm plans. Eighty-five percent of the watershed is covered by cooperative agreements. These original organizations have now been reorganized into the Nemaha Natural Resources District.

- 1/ Information from Nebraska Department of Environmental Control.
2/ For explanation of land capability classes, see "Land Capability Classification" - Agricultural Handbook Number 210.

Water and Related Land Resource Problems: Sheet and gully erosion is serious on the steeper slopes. Gully erosion is also a serious problem where the drains outlet into the Nemaha River. Generally speaking, the watershed has soils that are fertile and are being properly used, although additional land treatment is needed.

There is a need for some land use adjustment from cropland to native grassland in some areas.

Improved capacity to reduce runoff and erosion are major concerns in the watershed woodlands. Livestock control and improved management are needed to retain protective forest cover, increase hydrologic quality, and reduce downslope erosion. Encouraging desirable reproduction and discouraging weed species growth in all woodlands is needed.

Desirable timber is sometimes killed or seriously damaged when unwanted trees, brush, or woods are chemically sprayed. A more extensive educational program is needed on proper use of herbicides.

Floodwater Damage: Damaging floods occur annually on the Lores Branch and Negro Branch flood plains. The majority of the flooding occurs during the months that crops are growing and are thus most vulnerable to damage. The relatively small storm events (5-year frequency or smaller frequency storms) are responsible for the bulk of present floodwater damages. Records indicate that floods occur on an average of 3 times every 2 years. The storm that might be expected to occur once in 100 years would flood about 606 acres while a storm that could be expected to occur once every 4 years would flood about 395 acres.

Estimated value of flood plain land is \$200 per acre. Some urban lands within the City of DuBois cross the flood plain of Lores Branch. These lands are subject to frequent flooding, but there are no improvements within the portion of the city located in the 100-year flood plain. No significant land use changes (which would affect land prices) are contemplated.

An estimated 606 acres of agricultural land are subject to floodwater damage in South Fork Watershed with 351 acres damaged annually by floodwaters. Average annual crop and pasture floodwater damages of \$4,420 are occurring in the watershed. In addition, an estimated \$440 in other agricultural (fences, livestock, farm buildings, etc.) damages are occurring annually.

Six bridges are subject to floodwater damage and are currently sustaining an estimated \$100 in average annual damages. Losses to bridges reflect an increased maintenance and replacement cost that is directly attributed to floodwaters.

Economic opportunities are somewhat limited in the watershed area. Economic losses due to floodwater damages are adding to this problem.

Indirect damages such as interruption of and extra travel due to road damage, damage to utilities, etc., result from floods occurring in the watershed. An estimated \$500 in indirect floodwater damage is occurring annually.

A storm which has been identified as a 1,000+ year storm frequency event occurred in South Fork Watershed on September 3 and 4, 1958. The storm caused an estimated \$69,500 in damages. Approximately 700 acres of agricultural lands were flooded. The damages (identified by the watershed sponsors) include damages sustained by the Chicago, Rock Island, and Pacific Railroad. The railroad has since been removed.

Sediment Damage: Sediment yields from the watershed are moderately high. Steep slopes, increased slope lengths, deep soils that are susceptible to erosion, land use, and degrading channels are some of the factors contributing to sediment yields.

Approximately 92,000 tons of sediment, from sheet erosion, are delivered to the Big Nemaha River from this watershed annually. Of this amount, 24,500 tons, 17,300 tons, and 50,200 tons are derived from Lores Branch, Negro Branch, and the east portion of the watershed respectively. Approximately 42,500 tons of sediment from gully erosion are delivered to the Big Nemaha annually. Of this amount, 10,300 tons, 4,800 tons, and 27,400 tons are derived from Lores Branch, Negro Branch, and the east portion of the watershed respectively. Sheet and gully erosion combined total 134,500 tons per year.

These amounts of sediment delivered to major streams reduce stream capacity and are harmful to stream fishery resources. Such sediment also reduces water quality and contributes to the degrading of the environment in general.

A total of 141 acres or 33 percent of the flood plain below planned structures are undergoing sediment damages. As related to loss in crop production the annual damage amounts to \$1,164.

Erosion Damage: Sheet erosion accounts for 68 percent of the sediment movement within the watershed. On cropland the results are reduced stands of crops and losses of fertilizer, as well as topsoil losses. Under present conditions, soil losses from cropland will average approximately 17 tons per acre annually and pastureland losses will average 6 tons per acre.

Gully, roadside, and streambank erosion account for 32 percent of the sediment production.

Eighty-seven acres or 14 percent of the flood plain below planned structures are undergoing scour damages. As related to loss in crop production the annual damage amounts to \$2,580.

Gully erosion is a major problem in the watershed. Channel straightening and lowering of base-grade in the Big Nemaha River has started a new cycle of erosion. Left uncontrolled, this series of overfalls in the smaller tributaries will continue upstream until the gullies have voided or damaged, to some degree, a significant portion of the land within the drainage area. Terraces and grassed waterways essential to on-farm conservation programs cannot be installed or will be destroyed since the overfalls will move up the waterways and through the terrace system. This same acceleration occurs along road ditches thus increasing maintenance costs of bridges and farm crossings. As roadside gullies widen they will often destroy the road or abutment areas, creating a public safety problem as well. Approximately 2.5 acres of land per year will be destroyed or rendered useless at the present rate of projected gully growth in those areas where project structures are planned.

Gully growth (void damage) will physically destroy or render unusable an estimated 111 acres of cropland during the 50-year evaluation period at the sites discussed in this plan. These void damages will average \$2,479 annually. Gullies will also damage roads and bridges at 2 locations for an average annual damage of \$312.

In addition to direct damages resulting from gully growth, economic returns to land above an unstable grade are reduced. The absence of a suitable outlet for runoff water severely limits the use that may be made of land in the watershed above an unstable grade and thus limits the net return from the land. An estimated annual loss of \$24,611 to 1,480 acres of land is being sustained due to these associated land damages.

Deep gullies are also hazardous to livestock and often prevent livestock from crossing drains to properly graze pastures. Farm equipment and equipment operators are subjected to extremely hazardous conditions resulting from gully growth. Such gullies also detract from the overall appearance of individual farms and the countryside in general.

Total estimated erosion damages of \$29,980 are occurring in the watershed annually.

Irrigation: Rainfall is generally adequate for crop production. Irrigation water supplies are not readily available; however, such supplies would increase production.

Municipal and Industrial Water: The watershed is rural. Surrounding urban areas have a limited supply of water, but rural water districts are presently being organized that will result in additional water supplies to rural areas.

Recreation: There is an urgent need for water-based outdoor recreational facilities in the proposed watershed. Most existing water-based recreational areas are more than 40 miles distant from this watershed.

Pawnee and Richardson counties (which include South Fork Watershed) are in the Beatrice socioeconomic area, 1 of the 14 socioeconomic areas in the state. 1/ A Comprehensive Plan of this area indicates an existing deficiency of 600 acres of land and 7,840 acres of water developed for outdoor recreational activities.

Fish and Wildlife: The absence of natural lakes or potholes limits fish and water-oriented wildlife species to the few small stock ponds found in the watershed. Thus, if the watershed residents are to enjoy local fishing and a larger variety of wildlife, more and larger bodies of water are needed. Although the Missouri River satisfied some of this need, the swift current and silt-laden water makes it less desirable and limits its usefulness for recreation.

1/ Nebraska's "Comprehensive Plan for Outdoor Recreation" (1968)

Redevelopment: Pawnee county has experienced chronic underemployment and its population has been decreasing for a number of years. The county was designated a redevelopment area in 1969. Twenty percent of all families in Pawnee county have incomes below the poverty level. This is almost double the state average. 1/

Planned Project: Project measures in this work plan include additional land treatment, 14 grade stabilization structures, 2 floodwater retarding structures, and 1 multipurpose reservoir with storage capacity for floodwater and recreation including various recreational facilities.

Land Treatment Measures: During the 8-year installation period, land treatment practices will be installed throughout the watershed. Land treatment requirements are that 75 percent of all lands above each structural measure will be adequately treated. 2/ At least 80 percent of the total watershed is planned to be adequately treated when the project installation is complete.

Some of the conservation practices that are applicable to adequately treat the land include:

<u>Land Use</u>	<u>Conservation Practices</u>	<u>Description of Practice</u>
Cropland	Contouring	Farming sloping cultivated land in such a way that plowing, preparing land, planting, and cultivating are done on the contour.
	Strip Cropping	Growing crops in a systematic arrangement of strips or bands across the general slope to reduce water erosion.
	Terraces	An earth embankment or a ridge and channel constructed across the slope to reduce erosion from the rainfall runoff on the longer slopes.

1/ 1970 U. S. Department of Commerce, Bureau of the Census

2/ Land adequately treated is land used within its capability on which the needed conservation practices that are essential to its protection and planned improvement have been applied.

<u>Land Use</u>	<u>Conservation Practices</u>	<u>Description of Practices</u>
Cropland	Diversion	A grassed channel with a supporting ridge on the lower side constructed across the slope.
	Field Windbreaks	A strip or belt of trees or shrubs established within or adjacent to a field.
	Minimum Tillage	Limiting the number of field operations to those that are properly timed and essential to produce a crop and prevent soil damage.
	Grassed Waterways	A natural or constructed waterway or outlet shaped or graded and established in suitable vegetation as needed for the safe disposal of runoff from a field, terrace, or other structure.
	Grade Stabilization Structure	A structure to stabilize the grade or to control head cutting in natural or artificial channels.
	Drainage Field Ditch	A graded ditch for collecting excess water within a field.
	Subsurface Drains	A conduit, such as tile, pipe, or tubing installed beneath the ground surface and which collects and/or conveys drainage water.
Pastureland	Pasture and Hayland Management	Proper treatment and use of pastureland to maintain or improve the quality and quantity of forage, to protect the soil and reduce water loss.

A combination of 2 or more conservation practices may be needed to achieve adequate land treatment.

This total land treatment will be applied at a cost estimated to be \$318,840 by landowners and operators with assistance from going programs plus P.L.-566 technical assistance valued at \$24,900 and involving 5,400 acres of land. This will include improved fire protection to 31,100 acres within the watershed area.

Structural Measures: Fourteen grade stabilization structures will be installed to solve gully problems at 14 locations. These structures have a total planned construction cost estimated at \$221,400. An additional \$1,700 of nonproject cost for 1 structure located on an existing road will be furnished by local sponsors for the purpose of widening the dam to 28 feet in order that it may be used as a roadway. These structures are designed to prevent advancement of gully growth and to allow proper land treatment to be installed and maintained in the vicinity of the structures. By necessity of the engineering design, some sediment and floodwater storage will be provided by these structures.

Two floodwater retarding structures are planned to control 3.2 square miles of drainage area in Negro Branch at an estimated construction cost of \$99,500. These 2 structures will contain sediment storage to store that amount of sediment expected to be delivered to the sites during the 50-year project period which is 262 acre feet. They will also contain temporary storage for 528 acre feet of floodwater.

Site 2-A, a multiple-purpose floodwater retarding recreational structure, will control 7.64 square miles of drainage area along Lores Branch. This dam is designed to store 474 acre feet of sediment, 361 acre feet of recreational water, and 1,665 acre feet of floodwater. This multiple-purpose structure will require the purchase of 311 acres of land for public use that is presently all privately owned. It is primarily designed for and its use will be from the 15,700 people living within a 20-mile radius of the site.

Eighty-four and one-half acres of these lands will involve the recreational waters. The remaining will be used to temporarily store floodwater (60.5 acres) and (166 acres) for recreational purposes. Included is approximately 70 acres of native woodland to be preserved for nature and environmental studies. Development of this wooded area will be limited to a nature trail and used for primitive camping.

Other recreational facilities include parking facilities for 80 vehicles, 20 picnic tables, 10 cooking grills, sanitary facilities at 2 locations, boat launching ramp, drinking water supply, and other necessary items such as signs, roads, fences, etc. Two hundred trees will be planted for shade, beautification, and landscaping. This recreational facility is designed for a capacity of 320 people per day.

The recreational pool will be treated for removal of undesirable fish species and stocked with a balanced supply of game fish. Such fish stock are available through Federal fish hatcheries. Species and numbers of each species will be stocked as recommended by the Nebraska Game and Parks Commission. The sponsors' intent is to manage this resource for near maximum fish production.

During periods of heavy rainfall, water flowing through the principal spillway will result in losses from the recreation pool of some fish to the stream system; however, this loss is considered minor. The boat ramp and boat ramp access road may become unusable for periods up to a few days but not expected to occur annually. All other roads, picnic tables, sanitary facilities, and other recreational facilities will be constructed in areas not directly affected from floodwater storage.

During normal rainfall years the recreation pool has an 80 percent chance of fluctuating less than 2 feet. In exceptionally long periods of dry weather the pool could be lowered more but not expected to be lowered to that point of no use or endangering fish populations.

All 17 dams will be constructed with compacted earth. All areas disturbed during construction outside of permanent pool areas will be seeded to grasses suitable to the area. At least 8 acres of tree and shrub plantings will be established as a part of the vegetative program at the grade stabilization and floodwater retarding structures. These plantings will be established for wildlife food, cover, and walkways. They will also improve the aesthetic value of the areas.

Trees and brush cleared at the construction area and in the sediment or recreation pool will be cleared by mechanical means. Trees are normally cut by use of power saws no higher than 1 foot above the ground level. If the area to be cleared is to be used to borrow materials for construction of the dam, the stumps will be removed by use of bulldozers.

Impoundments will inundate about 6.6 miles of existing stream channels. One mile of these channels is classified as perennial, 2 miles intermittent, and the remainder ephemeral. The perennial stream to be inundated is at site 2-A.

Downstream from this site, this stream will be expected to remain as perennial after construction of the dam. Flows, however, are expected

to be reduced from those at present but normal seepage into and through drains constructed in the dam will produce some flowing water downstream.

Present land use in areas to be affected by construction of structural measures is as follows:

Area	:Cropland: : (Acres):	:Woodland: : (Acres):	:Pastureland: : (Acres)	:Gullies : (Acres)
Sediment and Recreation Pools	64	36	68	7
Flood Pools	51	34	74	11
Dams and Emergency Spillways	10	8	11	4

This project requires 33 acres of prime wildlife habitat plantings protected from domestic livestock grazing to mitigate expected habitat losses. Twenty-eight acres of such plantings will be established adjacent to site 2-A where most existing habitat losses are expected to occur. The remaining 5 acres are necessitated from small losses expected on most of the remaining 16 structures. Eight acres of wildlife habitat plantings will be established around these other structures through the normal vegetative program that will more than offset these losses.

The 33 acres to mitigate expected wildlife habitat losses were derived through studies by biologists representing the Bureau of Sport Fisheries and Wildlife, the Nebraska Game and Parks Commission, and the Soil Conservation Service. These studies involved 208 acres expected to be effected by the dams, emergency spillways, sediment pools, recreation pool, and flood pools. Based on the type and quality of existing habitat to be disturbed and comparing this with good quality wildlife habitat established for similar species and protected from domestic use, it was determined that 33 acres of such established habitat would mitigate the loss.

The total estimated cost of this project is \$1,076,240 with \$649,850 to be furnished by P.L.-566 and \$426,390 by local sponsors.

During construction of this project, contractors will be required to follow strict guidelines pertaining to air and water pollution. Air pollution guidelines are presently being developed in Nebraska that contractors will be required to adhere to. Guidelines for water pollution reduction during construction include construction of principal spillway prior to removing vegetation in other areas, selective borrow pit openings, and construction of diversions above emergency spillway areas. Sanitary facilities are required to be furnished by the contractor for use by construction employees during

construction. Other waste, such as oil containers, filters, tires, etc., are required to be disposed of through nearby approved disposal areas. Such disposal would be those presently existing for towns or cities in the area.

Sponsors are aware that structures other than 2-A will require sanitary facilities if used for recreation. Since these will be constructed on private lands, little recreational use is expected since site 2-A is being developed for public use.

Provisions of PL-86-523 relating to the preservation of historical and archeological data will be followed. Investigations by the National Park Service and the Nebraska Historical Society plus consultation of the National Register of Historical Places indicate that installation of the project will not encroach on any known archeological value or historical place. Should any historical or archeological artifact be uncovered or found during construction, the Nebraska Historical Society and the National Park Service will be notified.

This plan for solving water and related natural resource problems has been prepared by the sponsors (Nemaha Natural Resources District). They will assume all local responsibilities for installation, operation, and maintenance of planned works.

2. Environmental Impact

The primary impact to the environment from this project would be flood prevention, preserving agricultural lands, adding fish habitat, reducing sediment production to the stream systems, converting privately owned agricultural lands to public recreational lands, improving rural fire control capabilities, increasing multiple-use benefits from private woodland, temporary loss of wildlife habitat, and improving the general economy of the area.

Conservation land treatment will reduce sediment production to the Big Nemaha River by 18 percent, flood plain sediment and scour damages 15 percent, and floodwater damages 5 percent. Sheet erosion on about 5,700 acres of uplands will be reduced 22 percent. Gully erosion on those lands to be treated will be reduced 60 percent. These reductions result from installation of measures to reduce slope lengths and vegetation to stabilize watercourses. All such changes will improve water quality of watershed streams and also the stream systems further downstream.

The combination of land treatment and structural measures will reduce average annual sediment production to downstream systems by

42 percent. Flood plain sediment and scour damages will be reduced 80 percent. Flood damages to crops, pastures, fences, roads, etc., will be reduced 83 percent. These damage reductions result in increased incomes to owners and operators. They also improve stream quality by reducing sediment and cause less maintenance to manmade features.

Flood damages will be reduced on 606 acres of agricultural lands. Grade stabilization structures will prevent the loss of agricultural production on 111 acres. They will also increase production on 1,480 acres.

Project effects on reduction of floodwater discharge are as follows:

<u>Reach</u>	<u>Present Conditions</u> <u>Discharge</u> cfs	<u>Future with</u> <u>Structures</u> cfs
<u>Reach 1</u> <u>1/</u>		
100 yr.	7,860	4,270
10 yr.	4,665	2,480
4 yr.	3,515	1,825
<u>Reach 2</u>		
100 yr.	5,380	1,655
10 yr.	3,210	975
4 yr.	2,130	650
<u>Reach 3</u>		
100 yr.	5,820	3,720
10 yr.	3,440	2,200
4 yr.	2,585	1,660

A 100 percent chance of beginning flooding implies that a stream will probably reach or exceed bank-full capacity at least once annually. A 200 percent chance of beginning flooding means that on an average a stream will run bank full twice annually. A 25 percent chance of beginning flooding means that a stream will run full once in 4 years.

At present there is approximately a 190 percent chance of flooding versus a 70 percent chance with project in Reach 1. An 86 percent reduction in floodwater damages is anticipated in this reach.

In Reach 2, the percent chance of beginning flood damage will be reduced from approximately 140 percent to approximately 6 percent. A 98 percent reduction in floodwater damages is anticipated in this reach.

1/ For Reach locations see Appendix B.

The percent chance of annual flooding in Reach 3 will be reduced from approximately 115 percent to 40 percent by project measures. Average annual floodwater damages will be reduced approximately 77 percent.

No significant land use changes are contemplated as a result of project measures. The level of protection planned for the flood plain would not be sufficient to warrant land use changes to more intensive land use than is presently practiced.

The present 134,500 average annual tons of sediment delivered to the Big Nemaha will be reduced to 78,000 tons. Gully erosion is responsible for 42,500 tons of this sediment at present but this will be reduced to 17,400 tons per year from installation of grade stabilization structures.

Grade stabilization measures will prevent the loss of 111 acres of land (or 2.2 acres per year) that would be damaged by advancing gullies. An additional 1,480 acres, whose use is being restricted due to the presence of unstable grades, will benefit from project measures.

A thorough investigation of available publications and reports 1/ indicates that sediment and water quality stations are lacking in the immediate area of South Fork Watershed.

The high sediment reduction to the Big Nemaha would indicate that the present water quality would be enhanced, or at least maintained, to the Missouri River.

The reduction in sediment yield to the channel during times of flooding would benefit the ecosystem. Reduced sediment deposition on the flood plain would be beneficial to wildlife habitat areas.

Sixty-five farm families or 250 people will receive direct increased average annual net incomes from floodwater retarding and grade stabilization features of this project. This is an average of 33.8 acres per farm. This will result from reduced flood damages to crops, pastures, and fences; reduced inconvenience and less interruptions of the normal way of life that relates to peace of mind.

1/ Catalog of Information on Water Data - Water Quality Stations
USGS-1966
Quality of Surface Waters of the U. S. - USGS Water - Supply Papers, parts 5 and 6
Index Map, Corps of Engineers, Omaha, Nebraska. Map denotes USGS sediment and streamflow stations, also Corps of Engineers data stations with records, published and unpublished.
Missouri River Basin Comprehensive Framework Study, Hydrologic Analyses and Projections - June 1969
The Nebraska Water Quality Survey Conservation and Survey Division, University of Nebraska, 1965

Also, grade stabilization structures prevent lands from developing into large gullies thus continuing to reduce acres available for production.

The general economy of the area will become more stable by maintaining agricultural incomes. The 10 man-years of unskilled labor created by installing this project in a county designated as a redevelopment area because of chronic underemployment will also contribute to the general economy. Maintenance of project measures is also expected to create two-thirds of a man-year of unskilled labor.

Primary recreation activities relating to the multiple-purpose structure will be picnicking, fishing, boating, primitive camping, and environmental and nature studies. This facility will provide 22,500 visitor days of recreation annually.

The recreation site will provide 84.5 acres of recreation water plus an additional 226.5 acres of land for public use. All such lands are presently in private ownership. Such water and land will be open for use by the public throughout the year.

As a result of the recreation facilities for public use, increased traffic can be expected within the area of site 2-A. Such traffic will increase nuisances such as noise from vehicles plus added dust and exhaust fumes to cause increased air pollution. It can also be expected to result in less travel miles to water-based recreation for some users thus reducing similar problems in other more distant areas where such facilities are now available.

Structure numbered 2-A will be constructed across Lores Branch which is classified as a perennial stream from a point about 1 mile upstream from the dam site. By constructing this dam, normal flows within the stream immediately downstream are expected to be reduced. This reduction is not expected to exceed 25 percent of the present flow since drains built into the dam, normal seepage, and flow through the principal spillway will result in continued flowage of the stream and since present flows are an average 1.5 cubic feet per second throughout the year. This slight expected reduction would not effect Lores Branch as a stream fishery since it is presently classified by the Nebraska Game and Parks Commission as "Nonproductive" from the standpoint of a stream fishery. Further downstream where the Lores Branch flows into the South Fork of the Big Nemaha River this reduced flow would be so minute it would be incalculatable. The river at this point is classified as "Locally Important" as a stream fishery. 1/

1/ Stream classifications from "The Nebraska Fish and Wildlife Plan" - Volume 1 - Nebraska Wildlife Resource Inventory by the Nebraska Game and Parks Commission.

The total project will create about 175 acres of surface water that will provide fish habitat and provide new areas of resting and feeding for waterfowl. These waters will also improve habitat for other birds and animals desiring such surroundings.

The recreation pool at site 2-A extends under an east-west county road bridge but the flood pool will inundate the bridge and about 720 feet of roadway. This bridge and roadway will be raised to avoid possible inundation. Another public roadway is involved at site 2-1. This structure will be constructed with the top of the dam widened to 28 feet for use as a roadway. Such an installation will eliminate the present bridge which will save local taxpayers approximately \$300 annually, thus reducing the tax burden to county residents.

Installation of planned structural measures will cause a temporary loss of 208 acres of wildlife habitat having a value equal to 33 acres of established wildlife habitat plantings protected from livestock use. These 208 acres include open pasture, pasture with scattered trees, and both pastured and unpastured woodlands. The various amounts of these types of wildlife habitat were compared to good quality wildlife habitat protected from grazing to determine the 33 acres.

Operation and maintenance of the structures after construction, among other things, includes control of weeds and trees. Weeds are normally controlled by mowing. This is usually accomplished after the normal pheasant and quail nesting and hatching season. Tree growth is controlled along the shoreline, on the earthfill, and in the emergency spillway by mowing or spraying. If spray is used, it is applied with a hand sprayer in order to apply the spray directly to the young tree which in this watershed area will normally be willow, cottonwood, or elm.

This project will result in changed land use on 423 acres that are presently used for agricultural production. This includes cropland, woodland, and pastureland. An additional 11 acres will also be involved presently in miscellaneous use. These lands will now be used for public recreation, inundated by sediment and recreation pools, or used for dams and emergency spillways.

Lands involved in the dams and emergency spillways presently used for agricultural production and wildlife habitat will be seeded to grasses and protected from grazing. These lands, about 33 acres, presently have some wildlife habitat value that will be temporarily disturbed. Such habitat will be improved from that presently existing after such vegetation is established.

Planned structural measures will yield estimated average annual benefits of \$74,330. These benefits include damage reduction, recreation, redevelopment, and secondary. Reducing flood damage by \$34,290 annually to crops, pastures, roads, bridges, agricultural land, and agricultural properties (including buildings, livestock, fences, etc.) will increase agricultural incomes and consequently the standards of living for the direct beneficiaries.

Improved rural fire control through assistance of the Forest Service will increase fire protection to woodlands, pastures, and homes thus reducing fire losses and the chance of fire losses to local residents. Such protection is of particular importance during windy dry seasons, when large areas are susceptible to losses from wild-fire.

Providing recreation will benefit the community by making outdoor recreation more accessible to members of the community and nearby communities and by providing additional income to members of the community involved in recreation-based business. Redevelopment benefits can be anticipated by the South Fork community as unskilled labor will be employed in the construction and in the operation and maintenance of structural measures during the first 20 years of the project. Secondary benefits are anticipated as the increased agricultural income will generate additional income for the business community and other elements of the South Fork community.

The estimated average annual benefits to result from this project are \$74,330. The average annual costs of planned structural measures are \$53,090 (including local costs of operation, maintenance, and replacement of \$10,840). The benefit-cost ratio is 1.4:1.0. A summary of annual project costs, benefits, and benefit-cost ratio is attached to this statement. (Appendix A)

3. Favorable Environmental Effects

- a. Reduce sediment production to streams from this watershed by 42 percent.
- b. Reduce sediment and scour damages to flood plain lands by 80 percent.
- c. Reduce floodwater damages to crops, pastures, fences, roads, etc., by 83 percent.
- d. Reduce sheet erosion damages 70 percent on those lands treated.
- e. Prevent gully erosion at 14 locations thereby preventing the destruction or depreciation of 1,591 acres of agricultural land.
- f. Reduce the probability of crop loss to 65 families.

- g. Create 17 fisheries totaling 175 surface acres of water that will also serve as resting and feeding areas for waterfowl.
- h. Provide 22,500 visitor days of outdoor recreation in an area presently deficient in opportunities for outdoor recreation.
- i. Provide 311 acres of land, presently privately owned, for public recreational usage.
- j. Help stabilize the economy of the region.
- k. Create 10 man-years of unskilled labor employment during project measures installation.
- l. Create 2/3 man-years of unskilled labor employment annually to be utilized in operations, maintenance, and replacement of structural measures.
- m. Provide \$74,330 of monetary benefits (\$21,240 net) annually to local residents which will improve local economy creating an improved standard of living.
- n. Reduce damages to wildlife habitat to acceptable levels established as state goals.
- o. Improve management and increase multiple-use benefits on 330 acres of private woodlands.
- p. Improve fire protection to rural areas.

4. Adverse Environmental Effects Which Cannot be Avoided

- a. Construction of structures will result in temporary losses of wildlife habitat presently involving 208 acres that is equivalent to 33 acres of established wildlife habitat protected from domestic use.
- b. Agricultural production will be lost on 423 acres that will be involved in sediment and recreation pools, dams and emergency spillways, or devoted to public recreation.
- c. Construction of dams and emergency spillways will temporarily disturb the vegetative cover on 33 acres.
- d. Increased vehicle traffic in area of site 2-A.

5. Alternatives

Various alternatives were considered during the development of this plan. One of the first was that of increased land treatment. Such is a part of the plan which is to increase land treatment from the present 65 percent of the lands within the watershed to 80 percent. This increased land treatment is expected to cost \$343,740 which will justify its cost by reducing erosion, keeping sediment out of streams, preventing losses to seeds, and fertilizer plus improving moisture conditions for growing crops. The increased land treatment, alone, will decrease flood damages by only about 5 percent and will not satisfy recreational needs.

Since flood plain lands are used for agriculture production, flood plain zoning to prevent its use from such purposes would require monetary compensation to landowners. Such a plan would cost about \$300,000. Purchase of areas that will be affected by existing gullies would be of similar price. Such purchases would reduce or eliminate income to 65 families, forego beneficial effects from reduced sediment to stream systems, and forego any water-based recreational benefits. It would improve wildlife habitat in the area.

The plan as presented without public access to any structures or without furnishing any lands for public access was given full consideration. Such a plan would have reduced total costs about \$136,000 and prevented an average annual recreational benefit of \$132,300. Other effects would be similar to that of the adopted plan.

An alternative of no project would be leaving the existing problems as they are. Such would allow continued degradation of natural resources and forego any opportunity for public recreation. This would allow continued periodic hardships to local residents and encourage continued outmigration of local residents. Should the South Fork plan, as presented, not be implemented, net monetary benefits of \$21,240 will be foregone annually.

6. Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity.

Lands affected from this project are presently used for agricultural purposes and can be expected to continue in such use. This project will solve many erosion and flooding problems that are of immediate importance and preserve lands for future use. It will also relieve immediate needs for recreational areas and continue to furnish such benefits for at least 50 years. These project measures are compatible with the State's objectives for use of land, water, and other natural resources.

Structural measures are designed for sediment storage in order that recreational and floodwater storage will remain available for intended uses at the end of the project life. This provides structures that will function as designed beyond the project period.

Waters from this watershed flow into the South Fork of the Big Nemaha River. Only 1 watershed has previously been planned on the South Fork of the Big Nemaha which is located about 25 miles upstream from this watershed. The operational watershed (Rock Creek Watershed, Pawnee county, Nebraska) was planned to contain 5 floodwater retarding structures and 12 grade stabilization structures. Two floodwater retarding structures and 7 grade stabilization structures are constructed with the remaining structures scheduled for construction within the next few years.

Approximately 10 miles downstream along the South Fork of the Big Nemaha River from the east edge of the South Fork Watershed this river joins the North Fork of the Big Nemaha River. From this point the Big Nemaha River flows eastward for about 16 miles where it enters the Missouri River. The upper portion of the North Fork of the Big Nemaha River, an area of 114,980 acres, has been planned and approved for construction. This area, the Upper Big Nemaha Watershed, is planned to have 38 floodwater retarding structures and 59 grade stabilization structures. Eight and 18 respectively of these structures have been constructed with others scheduled for construction in the next few years.

At the junction of the North and South Forks the Upper Big Nemaha Watershed structures will reduce the 100-year frequency peak cubic feet per second flow by about 3 percent and the Rock Creek Watershed structures will reduce this same peak another 0.5 percent. Due to the distance of travel between these watersheds, the addition of the South Fork Watershed structures will reduce this same peak less than 0.5 percent; therefore, the cumulative effect would be negligible.

Smaller storms ranging up to 10-year frequency would be reduced by 5.5 percent as a result of the 2 approved watersheds at this river junction; but, again, the South Fork Watershed would furnish a negligible reduction at this point.

Sediment reductions from the 2 approved watersheds are reduced at the junction of the North and South Forks Rivers by about 4 percent. The South Fork Watershed structures will decrease this rate by at least 1 percent for a cumulative reduction of 5 percent.

7. Irreversible and Irretrievable Commitments of Resources.

Structural measures will provide 175 acres of water on lands presently in agricultural use. Approximately 40 percent of this land is presently cropland, 40 percent pastureland, 4 percent gullies, and 16 percent woodland.

About 33 acres of additional land presently used as cropland, woodland, and pastureland in almost equal proportions will be used as dams and emergency spillway areas. About 170 acres of land will be occasionally flooding during storm events. These are lands included in flood pools. Presently 44 percent of this area is pastureland, 30 percent is cropland, 20 percent is woodland, and 6 percent is eroded and gullied areas. These 170 acres include 81 acres within the flood pool of the proposed multiple-purpose structure 2-A.

One hundred sixty-six acres of land presently almost equally used as pastureland and woodland will be purchased by the sponsors and used as public recreation lands. Woodland areas will be maintained for environmental and nature studies. These areas are expected to improve as habitat for wildlife. The pastureland will also be fenced to exclude livestock. Most of this land can be expected to revert to native trees and shrubs.

No other permanent commitment of resource is known to be required for this project.

8. Consultation with Appropriate Federal Agencies and Review by State and Local Agencies Developing and Enforcing Environmental Standards.

a. General

The application for assistance for the South Fork Watershed was submitted to and approved by the Nebraska Natural Resources Commission. The plan for solving water and related land resource problems was developed in full consultation with Federal, state, and local agencies as well as with watershed residents. Prior to preparation of the final work plan, an informal field review was held in the watershed at which time interests were invited to present their views and recommendations either orally or in writing.

Biological aspects of the project were evaluated by biologists representing the Bureau of Sport Fisheries and Wildlife, the Nebraska Game and Parks Commission, and the Soil Conservation Service. The primary purpose was to determine beneficial and detrimental effects to fish and wildlife.

The National Park Service and the Nebraska Historical Society were notified of the intent of this work plan. They have indicated that significant areas of historic interest are not known to be involved and that such is unlikely. The only known site of archeological interest will not be disturbed by construction of planned measures.

The informal interagency review included 10 Federal agencies and 9 state agencies who were furnished copies of the draft work plan and work plan agreement plus a preliminary draft copy of the environmental impact statement. These agencies were given 30 days to review these documents and then invited by the watershed sponsors to attend a meeting with the sponsoring boards to discuss these documents and offer any inputs or comments they might have. The only agency representatives attending this meeting were the State of Nebraska Natural Resources Commission and the Agriculture Stabilization and Conservation Service.

Written responses, however, were received from most agencies, none of which objected to the plan but several agencies did offer inputs and comments. All such information appearing applicable was included into these documents.

b. Discussion and Disposition of Each Problem, Objection or Issue Raised on the Draft Environmental Statement by Federal, State, and Local Agencies; Private Organizations and Individuals.

The following is a list of agencies requested to comment on the Draft Environmental Statement:

- U. S. Department of Commerce
- U. S. Department of Health, Education and Welfare
- U. S. Department of the Army
- U. S. Department of the Interior
- U. S. Department of Transportation
- U. S. Environmental Protection Agency, Region VII
- Governor of Nebraska
- Southeast Nebraska Planning Commission

The comments furnished and the disposition of such comments are summarized as follows:

U. S. Department of Commerce

Comment - "The climatological description of the watershed is overly brief, especially since rainfall is acknowledged as often presenting flooding problems." They further suggested contacting the Environmental Data Service for obtaining additional climatological data.

Disposition - Contacted the Environmental Data Service, U. S. Department of Commerce, as suggested. They suggested furnishing references in order that the reader could gain additional information on the subject if desired. A footnote was added to the end of the first paragraph of page 2 with references as recommended.

U. S. Department of Health, Education and Welfare

Comment - Stated that the proposed project does not have any apparent impact on their programs.

Disposition - None required.

U. S. Department of the Army

Comment - They could foresee no conflict with any projects or current proposals of their department.

Disposition - None required.

U. S. Department of the Interior

Comment 1 - Requested the Director, Midwest Region, National Park Service be kept informed on the progress of this proposal so that any necessary archeological work appropriate to the post-authorization phase can be programmed and completed prior to the start of construction.

Disposition - Such recommendation has been included and made a part of this statement (See page 17, second full paragraph).

Comment 2 - Requested the Fish and Wildlife Service, U. S. Department of the Interior report dated January 24, 1973, be appended to this report when it is forwarded to the Congress.

Disposition - Report has been made a part of Appendix "C".

Comment 3 - Suggested that each section of the Environmental Impact Statement could be reorganized under more specific subheadings.

Disposition - Although these documents were not furnished for comments regarding format, changes were nevertheless made regarding headings and subheadings in an attempt to help the reader.

Comment 4 - Suggested including maps and drawings showing the pertinent project features such as structures, spoil and borrow areas.

Disposition - Appendix "D" was added that contains 5 pages of typical drawings of structures which include all types of structures included in the plan.

Comment 5 - Suggested expanding the section "Project Features" to provide a full description of the principle project features.

Disposition - This comment is also in the area of suggestions and not directed toward environmental issues. Since there is no heading or subheading "Project Features" there is a question

regarding the comment. The Environmental Setting section has, however, been rewritten and some additional sections altered to better describe the project.

Comment 6 - This comment suggested a more detailed discussion in the Environmental Setting section regarding climate, topography, specific listing of flora and fauna, and a discussion on rare and endangered species present, if any.

Disposition - A large portion of the subject section was rewritten to include many of these items. As for the portion regarding rare and endangered species, nothing was written on the subject in the draft copy of the Environmental Impact Statement primarily because the subject was omitted in the report developed by the agencies responsible for rare and endangered species (Nebraska Game and Parks Commission and the Bureau of Sport Fisheries and Wildlife). A sentence has been added regarding this subject on page 6, last sentence under the heading Fish and Wildlife Resources. The Soil Conservation Service biologist agrees with this statement and representatives of the other 2 previously mentioned agencies agreed verbally at an August 14, 1973 meeting to this statement.

Comment 7 - This refers to the lack of discussion on archeological and historical values.

Disposition - The Nebraska Historical Society and the Midwest Region, National Park Service have been kept informed on the planning of this watershed. They were both furnished a copy of the Draft Work Plan and a Preliminary Draft Environmental Impact Statement more than 1 year ago. The Midwest Archeological Center made a reconnaissance of the area in May, 1973. A letter of correspondence consisting of a report was directed to the Soil Conservation Service Watershed Planning Staff Leader (a copy of which is included in Appendix "C") from the Acting Chief, Midwest Archeological Center. The only archeological site found was near a structure included in the plan and downstream from it. This site was in an area not planned to be disturbed but nevertheless it has been marked on the land rights map as an area not to be disturbed (See Page 7).

A paragraph has also been added on page 17 regarding historical sites.

Comment 8 - Suggested consideration be given to the possible impacts of sediment reduction on the downstream aquatic ecosystems and on water quality.

Disposition - Nothing on this subject was furnished by agencies primarily responsible for such matters. Research of existing data was of little help. Some information, however, on this subject has been incorporated on page 19.

Comment 9 - This comment questioned the result of constructing and operating 17 new dams on vector control problems and suggested that further discussions may be warranted to clarify this point.

Disposition - The U. S. Department of Health, Education and Welfare made no comment regarding vector control problems. This term (vector) biologically speaking refers to insects which carry and transmit disease-causing microorganisms. No such water-related insect is known to exist in the area except perhaps for mosquitoes. Since construction of the dams will purposely avoid the development of small isolated water areas, most such problems can be avoided. It is generally conceded, however, that such dams will result in some mosquito breeding areas and that this problem is considered minimal when compared to the mosquito problems associated with heavy rainfalls that result in large areas being flooded.

Comment 10 - States that the Environmental Impact section should contain a sentence indicating that the National Register of Historic Places has been consulted and the necessary follow-up should be made as a result of the findings in the Register.

Disposition - Information added in second full paragraph on page 17 as suggested.

Comment 11 - Questioned lands under jurisdiction of the U. S. Government.

Disposition - None involved (Page 5, second paragraph).

Comment 12 - Stated that the Environmental Impact section would be improved by discussing the acreage per farm in the flood plain that would be benefitted.

Disposition - Information added in last paragraph of page 19 as suggested.

U. S. Department of Transportation

Comment - None and no objection to this project.

Disposition - None required.

U. S. Environmental Protection Agency, Region VII

Comment 1 - "The statement mentions that downstream from Site 2-A, the flows will be reduced. The expected amount of flow reduction should be given in the statement along with a discussion of possible effects on the fishery downstream."

Disposition - An additional paragraph was added at the bottom of page 20 to more clearly explain this effect.

Comment 2 - "Reference is made in the (draft) statement to vegetation removal during project construction. If pesticides are to be used in clearing or maintenance operations, this should be discussed along with steps taken to mitigate any harmful effects to the environment."

Disposition - A paragraph was added near the bottom of page 15 regarding the clearing of trees. The fourth paragraph on page 21 explains normal operation and maintenance procedures.

Comment 3 - Suggested the statement regarding disposal of trash or waste during construction specify the type of disposal areas that would be used.

Disposition - A detailed explanation is included at the bottom of page 16 and the top of page 17.

Comment 4 - Draft Statement review was rated LO-2 indicating that the agency had no objections to the proposed action as described in the draft impact statement and watershed work plan. It is requested that the Soil Conservation Service provide the requested information in the final statement.

Disposition - As indicated in the first 3 comments and the disposition of each, every effort has been made to comply to this request.

Governor of Nebraska

Comment 1 - Requested the Soil Conservation Service to consider modification of their mitigation guidelines to adequately take into account the value of interspersion or location relationship of various components comprising the habitat for a given species in planning the location and species of replacement wildlife cover plantings.

Disposition - Correspondence from the Governor was replied to by the Soil Conservation Service Administrator indicating that the flexibility desired by the Governor is believed to be incorporated in the Soil Conservation Service policy. It further states that the only Soil Conservation Service basic requirement is that unavoidable losses be mitigated to the maximum possible degree. Toward this end, the Soil Conservation Service must insist that arrangements for installing, operating, and maintaining the mitigating measures be as firm and explicit as for the structural measures causing the need for mitigation.

Comment 2 - Stated that Policy Statement XXIX (Revised), adopted by the Nebraska Natural Resources Commission on March 1, 1973, states the official state position on this project.

Disposition - None required since subject statement urged early federal funding for this project.

Southeast Nebraska Planning Commission

This regional clearinghouse reviewed the draft work plan and preliminary draft environmental impact statement, had no adverse comments, and approved the project. They were furnished a copy of the official Draft Environmental Impact Statement with a request to review and comment. More than 90 days have passed, therefore in accordance with regulations, compliance is assumed.

9. List of Appendices:

Appendix A - Comparison of Benefits and Costs for Structural Measures

Appendix B - Project Map

Appendix C - Letters of Comment Received on the Draft
Environmental Impact Statement

Appendix D - Typical Drawings of Structures Included in
this Project

APPROVED BY Kenneth E. Grant DATE 10-25-73
Kenneth E. Grant, Administrator

COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES
South Fork Watershed
(Dollars)

Evaluation Unit	Average Annual Benefits 1/				Average : Benefit	
	Damage :	Reduction 2/ :	Recreation :	Redevelopment :	Secondary :	Total : Annual : Cost : Ratio
<u>Negro Branch</u>						
Grade Stabilization Structures						
3-1 and 3-4; floodwater	7,380	-	850	1,050	9,280	8,950 1.0:1.0
retarding structures 3-C and 3-D						
<u>Lores Branch</u>						
Grade Stabilization Structures						
1-1, 2-1, 2-5, 2-6, 2-8, 2-10	20,500	33,750	2,090	1,490	57,830	33,725 1.7:1.0
and 11-1; multiple-purpose						
structure 2-A and recreation						
facilities.						
<u>4-2</u>	2,280	-	110	210	2,600	2,165 1.2:1.0
<u>14-1 and 14-5</u>	2,130	-	100	180	2,410	1,760 1.4:1.0
<u>14-4</u>	1,020	-	60	50	1,130	1,020 1.1:1.0
<u>16-3</u>	980	-	30	70	1,080	590 1.8:1.0
Project Administration						4,880
GRAND TOTAL	34,290	33,750	3,240	3,050	74,330	53,090 1.4:1.0 1/

1/ Price base adjusted normalized.

2/ In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of \$1,790 annually.

3/ Based upon 5-3/8% discount rate applicable when the plan was developed. The benefit-cost ratio is 1.2 to 1 based upon the discount rate of 6-7/8% which became effective on October 25, 1973, in accordance with the Water Resources Council's Principles and Standards.

